Space Weather Technical Forecast

Issued on Wednesday 26 March 2025 at 01:00 Local

This technical forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: G1/Minor storms likely, chance of G2/Moderate geomagnetic storms days 1 and 2, reducing thereafter.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low in the past 24 hours, with occasional C-flares. The largest flare was from AR4030 in the southwest, reaching C9.5 at 25/1229 UTC. There are currently five sunspot regions on the Earth-facing disc. All of which are small and magnetically simple. AR4036, approaching the northwest limb, remains the largest group, with a large asymmetric leader, though a complete analysis of this spot is now difficult as it rounds the northwest limb. Recently numbered AR4043 in the northeast has exhibited recent growth as spots have developed to the north of this region. All other spots are small and simple at present.

No clear Earth-directed CMEs were observed, though an eruption on the morning on 25th may give a slight chance of a glance on day 4 (29 Mar), though this is low confidence.

Solar Wind / Geomagnetic Activity: Solar wind parameters, as measured by DSCOVR at L1, were indicative of background conditions with a late increase, likely due to the early signs of a connection to CH25/+. Speeds were generally slow-ambient, around 350-400 km/s. Density gradually rose from average to above average, peaking at 25ppcc at 25/2342UTC. The Interplanetary Magnetic Field, Bt, was mostly moderate before becoming strong after 25/2355UTC with a peak of 17nT. The north-south component, Bz, remained largely weak and variable but became consistently negative after 25/1515UTC, with a period of -4 to -8nT. The phi angle was negative (towards the sun). Geomagnetic activity was at Quiet to Active (Kp2-4).

Energetic Particles / Solar Radiation: High energy proton flux (greater than 10MeV) at GOES18 was at background levels. High energy electron flux (greater than 2 MeV) was at background to moderate levels. The 24-hour fluence was below the Active threshold. The observed integrated pfu was 3.77e6 at 25/0000 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low solar activity is expected, with a slight chance of isolated M-class flares over the next four days.

Solar Wind / Geomagnetic Activity: No clear Earth-directed CMEs feature in the forecast, though an eruption on 25th may give a slight chance of a glance on day 4 (29 Mar), though this is low

---

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

confidence.

Solar winds are expected to rise from slow-ambient levels, gradually increasing to become slightly elevated then perhaps elevated day 1 (26 Mar), perhaps becoming strong by day 2 (27 Mar) with the expected arrival of a HSS from the unusually prominent coronal hole feature, CH25/+. The enhanced geomagnetic activity from the HSS is likely to persist through into day 3 (28 Mar), before beginning to gradually ease by day 4 (29 Mar).

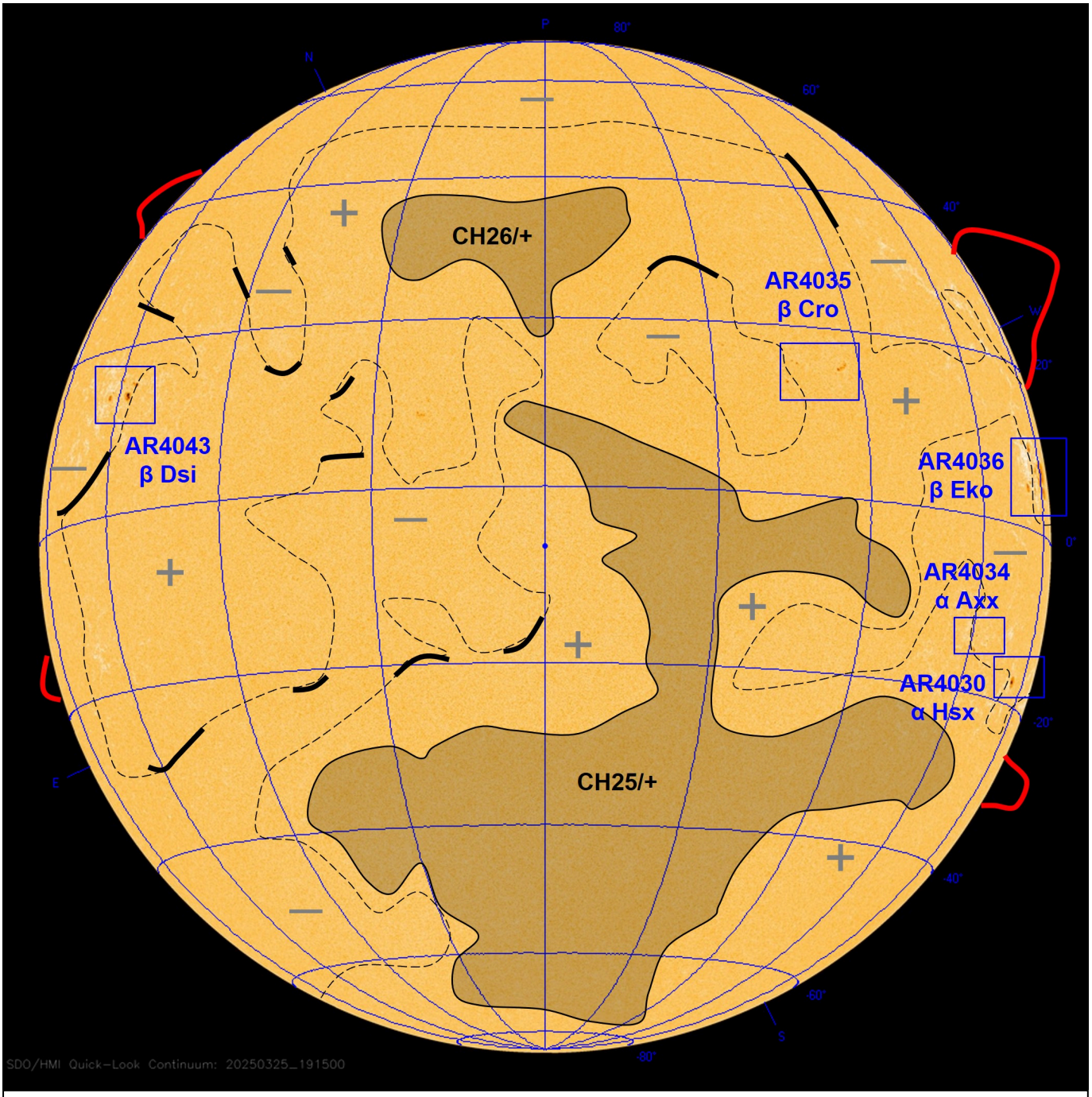
Unsettled to Active conditions initially will likely become G1/Minor storm (Kp5), with a chance of G2/Moderate storms (Kp6) due to CH HSS influences, peaking day 1 or day 2 (26/27 Mar) before easing later day 3 into day 4 (28/29 Mar), becoming generally Quiet to Unsettled (Kp1-3) by the end of the period.

Energetic Particles / Solar Radiation: High energy proton flux is expected to be at background levels, with a only a very slight chance of enhancement from any larger flares. High energy electron flux is expected to continue at largely background to moderate levels until later in the period, when it may become diurnally high. Electron (1e8 integrated pfu) fluence should remain below the Active threshold throughout the period.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 1: MOSWOC Solar Synoptic Map valid 25/1915UTC.



Key: Filament ___ , Prominence ___ , Magnetic Field Line - - - , Polarity +/-, Coronal Holes: Grey shaded area CHxx +/-, Sunspot groups 25xx - Mt Wilson α-β-βγ-βγδ and Zurich-McIntosh Axx etc.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Geomagnetic Storms

There are no clear Earth-directed CMEs in the forecast at present, though an eruption on 25th may give a slight chance of a glance on day 4 (29 Mar), though this is low confidence.

Solar winds are expected to rise from slow-ambient levels, gradually increasing to become slightly elevated then perhaps elevated day 1 (26 Mar), perhaps becoming strong by day 2 (27 Mar) with the expected arrival of a HSS from the unusually prominent coronal hole feature, CH25/+. The enhanced geomagnetic activity from the HSS is likely to persist through into day 3 (28 Mar), before beginning to gradually ease by day 4 (29 Mar). During the previous rotation solar winds exceeded 700 km/s for a time. Both the MOSWOC Enlil output and SWPM are likely providing reasonable guidance, with a weighting toward persistence given a similar structure to this coronal hole was observed on last rotation.

Unsettled to Active conditions initially will likely become G1/Minor storm (Kp5), with a chance of G2/Moderate storms (Kp6) due to CH HSS influences, peaking day 1 or day 2 (26/27 Mar) before easing later day 3 into day 4 (28/29 Mar), becoming generally Quiet to Unsettled (Kp1-3) by the end of the period.

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	60	40	20
Strong	G3	No	15	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 2: MOSWOC ENLIL

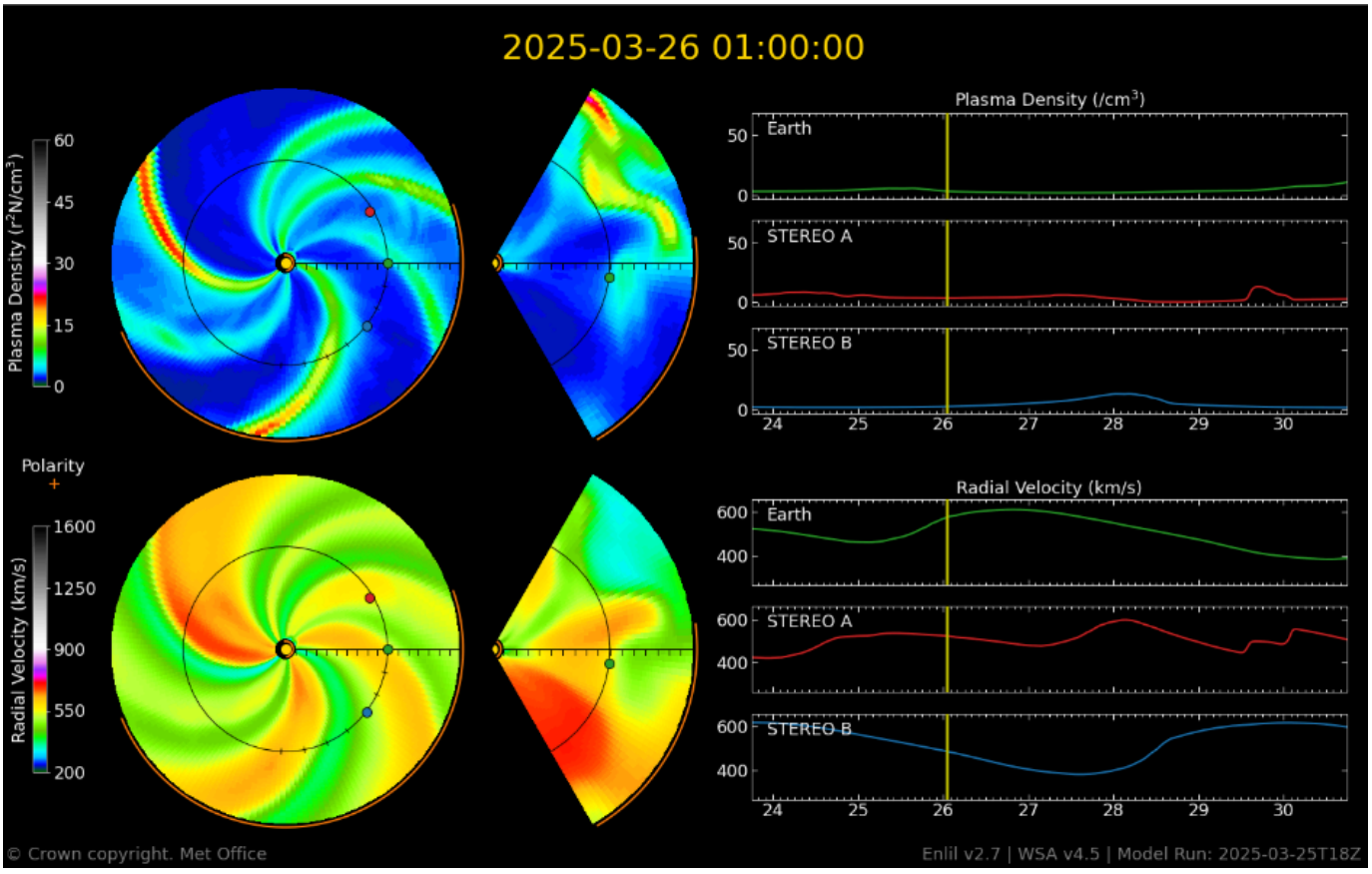
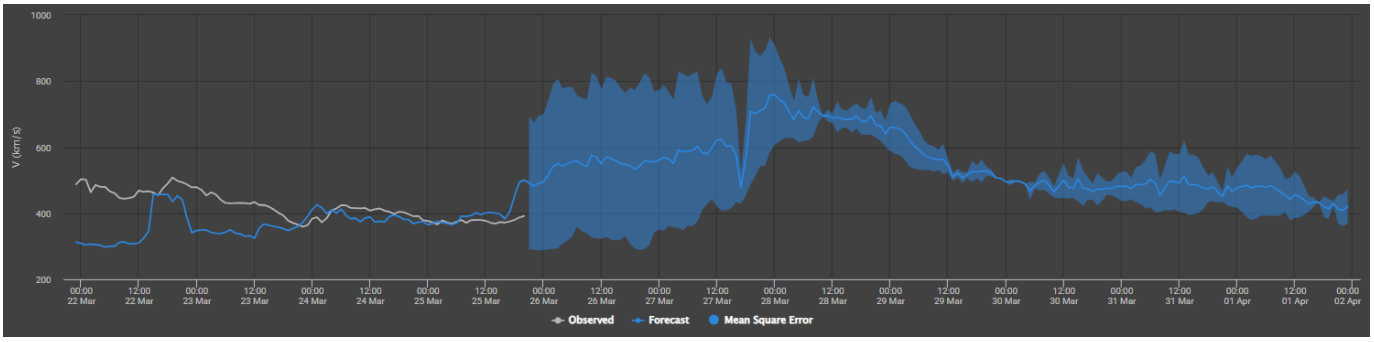


Figure 3: MOSWOC SWPM



© Crown Copyright 2025. All Rights Reserved.

Radio Blackouts - X-Ray Flares

Solar activity has been Low in the past 24 hours, with occasional C-flares. The largest flare was from AR4030 in the southwest, reaching C9.5 at 25/1229 UTC.

There are currently five sunspot regions on the Earth-facing disc. All of which are small and magnetically simple. AR4036, approaching the northwest limb, remains the largest group, with a large asymmetric leader, though a complete analysis of this spot is now difficult as it rounds the northwest limb, therefore it's classification is preserved. Recently numbered AR4043 in the northeast is becoming clear, and with recent growth evident as spots have developed to the north of this region. All other spots are small and simple at present.

Low activity is expected to continue, with a slight chance of isolated M-class flares. The greatest risk probably coming from AR4036 in the northwest, however this will rotate to the far side during this guidance period.

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	No	20	15	15	15
Very Active	R3-R5 (X Class)	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 4: 24 hour X-ray trace

© Crown Copyright 2025. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

GOES18 high energy (>10MeV) proton flux was at background levels. Proton flux is expected to remain at background levels, with only a slight chance of enhancement due to the current lack of large, complex spot groups on the Earth facing disc, with a reducing trend with time due to AR4036 rotating around the western limb.

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	1	1
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

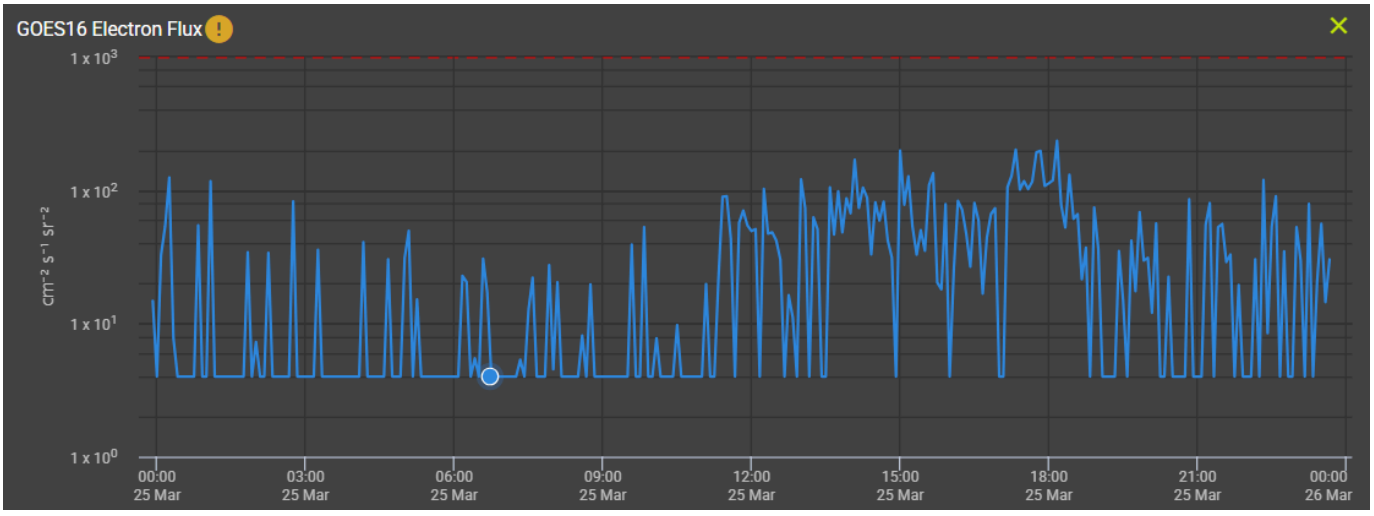
High Energy Electrons (≥ 2MeV)

GOES16 High energy (>2MeV) Electron flux has been at background to moderate levels. With a chance of enhanced geomagnetic activity due to the HSS from CH25+ at the start of the period, the Van Allen belt is likely to suppressed away from GEO and electron flux is therefore expected to remain at background to moderate levels. However, as the geomagnetic activity wanes by the end of the period, the charged electron belts may expand back out to the location of GEO, seeing a rise in the electrons later in the period.

Electron (1e8 integrated pfu) fluence should remain below the Active threshold throughout the period. MOSWOC REFM shows the electron fluence should remain below the Active threshold throughout the period, with a rising trend and is considered reasonable guidance with moderate confidence currently.

GEO Electron Environment	Level ($cm^{-2}sr^{-1}$ day^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ 2 MeV ≥ 1×10^{8}	No	1	5	20	30
Very Active	≥ 2 MeV ≥ 1×10^{9}	No	1	1	1	1

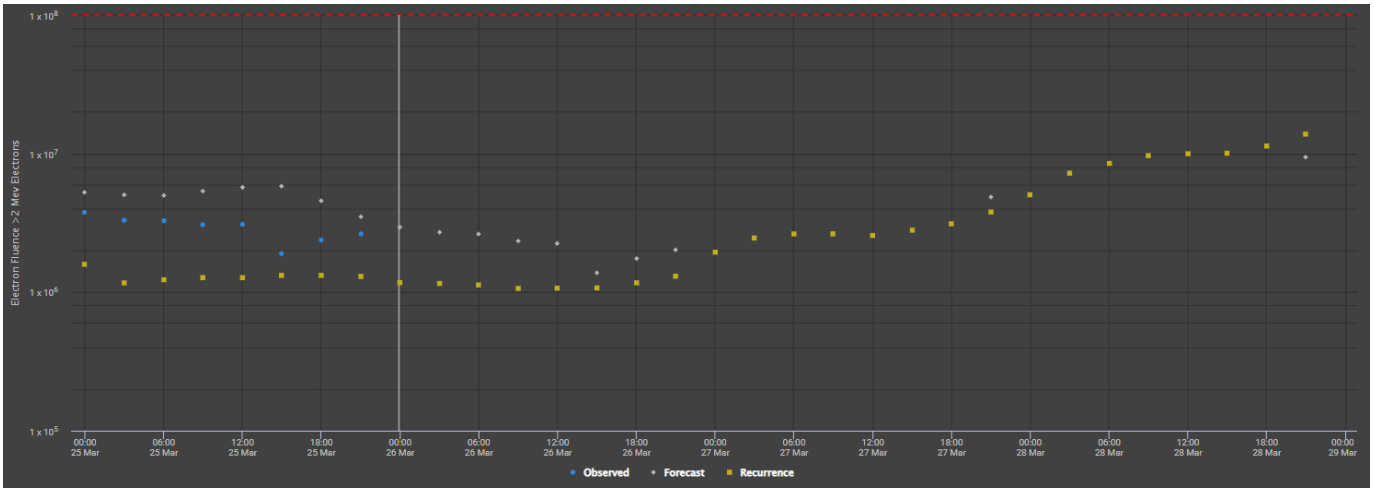
Figure 5: 24 hour electron flux trace



Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 6: MOSWOC REFM electron fluence forecast/observations/recurrence



© Crown Copyright 2025. All Rights Reserved.